Human Immunodeficiency Virus (HIV)
and
Acquired Immunodeficiency Syndrome (AIDS)

✓DISEASE AND EPIDEMIOLOGY

Clinical Description:

Infection with HIV produces a spectrum of disease that progresses from an Acute Infection (Stage 0) to clinically latent or an asymptomatic state (Stage 1 or 2) to AIDS (Stage 3). AIDS represents the most advanced stage of disease.

As the immune system weakens, a variety of complications start to appear.

- Some people have a flu-like illness within a month or two after exposure to the virus. This illness may include fever, headache, fatigue, enlarged lymph nodes, or a rash. These symptoms usually disappear within a week to a month and are often mistaken for those of another viral infection.
- Symptoms that may be experienced months to years before the onset of Acquired Immunodeficiency Syndrome (AIDS) include: lack of energy, weight loss, frequent fevers and sweats, persistent or frequent yeast infections (oral or vaginal), persistent skin rashes or flaky skin, pelvic inflammatory disease that does not respond to treatment (in women), and short-term memory loss.
- In people with AIDS, opportunistic infections are often severe and sometimes fatal because the immune system is so ravaged by HIV infection that the body cannot fight off certain bacteria, viruses, fungi, parasites, and other microbes. Symptoms of opportunistic infections common in people with AIDS include: coughing and shortness of breath, seizures and lack of coordination, difficult or painful swallowing, mental symptoms such as confusion and forgetfulness, severe diarrhea, fever, vision loss, nausea, abdominal cramps, and vomiting, weight loss and extreme fatigue, and severe headaches.

Causative Agent:

The human immunodeficiency virus (HIV) is a retrovirus. HIV type 1 (HIV-1) and, less commonly, HIV-2, a related virus that is extremely uncommon in the United States but more common in West Africa.

Differential Diagnosis:

The most common symptoms associated with acute infection occurring 2-6 weeks after exposure are often associated with influenza-like illness. A rash may also develop during to or up to a week and the differential diagnosis includes infectious mononucleosis, pityriasis rosea, secondary syphilis, drug reaction, or toxic erythema due to another infectious cause.

Laboratory identification:

(Insert 4th GEN Algorithm)

Treatment:

Primary care physicians are encouraged to participate actively in the care of HIV-infected patients in consultation with specialists who have HIV expertise. Guidelines for the treatment of HIV/AIDS are updated on a regular basis. For updated treatment guidelines, please see:

www.cdc.gov/hiv/topics/treatment
or
www.hrsa.gov/publications/january2007

Case Fatality:

More than 20 million people with HIV/AIDS have died since the first AIDS cases were identified in 1981. As of December 31, 2002, an estimated 501,669 people with AIDS in the U.S. had died. The introduction of new antiretroviral therapies for HIV/AIDS has enabled individuals to live longer.

Reservoir:

Humans are the only natural host.

Transmission:

HIV is spread through sexual contact with an infected person, by sharing needles and/or syringes (primarily for drug injection) with a person who is infected with HIV, or less commonly (and now very rarely in countries where blood is screened for evidence of HIV infection), through transfusions of infected blood or blood clotting factors. Infants born to HIV-infected women may become infected before or during birth, or through breastfeeding after birth.

Susceptibility:

Susceptibility is unknown, but presumed to be general: race, gender, and pregnancy do not appear to affect susceptibility to HIV infection or AIDS. The presence of other sexually transmitted infections, especially if ulcerative, increases susceptibility. Recent data indicates that circumcision of males is protective against infection.

Incubation period:

Among patients enrolled in large epidemiologic studies, the median time from infection with HIV to the development of AIDS-related symptoms has been approximately 10–12 years in the absence of anti-retroviral therapy. However, researchers have observed a wide variation in disease progression. Approximately 10% of HIV-infected people in these studies have progressed to AIDS within the first 2–3 years following infection, while up to 5% of individuals in studies have stable CD4+ T cell counts and no symptoms even after 12 or more years.

Period of communicability:

The period of communicability is not known precisely. It begins early after onset of HIV infection and presumably extends throughout life.
Infectiousness with HIV may be variable; anyone with a positive test for HIV antibody and/or detectable HIV in the blood should be considered infectious. The degree of correlation between quantity of circulating virus and infectiousness is not clearly established, although lower viral counts appear to reduce the risk of transmission. HIV is a chronic infection and persons with HIV remain infectious indefinitely.

Epidemiology:

The number of people newly infected with HIV has fallen to the lowest level in over two decades, according to the latest available data – testament to the impact of the world's efforts to vanquish the global HIV epidemic. The estimated 2.1 million [1.9–2.4 million] people globally who acquired HIV for the first time in 2013 were 15% fewer than the 2.5 million [2.3–2.7 million] who acquired the virus in 2009, the baseline for the WHO Global Health Sector Strategy on HIV/AIDS. In addition, they were 38% fewer than the estimated 3.4 million [3.3–3.6 million] people who acquired HIV in 2001. (WHO, Global Update on the Health Sector Response to HIV, 2014)
CDC estimates that 1,201,100 persons aged 13 years and older are living with HIV infection, including 168,300 (14%) who are unaware of their infection[1]. Over the past decade, the number of people living with HIV has increased, while the annual number of new HIV infections has remained relatively stable. Still, the pace of new infections continues at far too high a level— particularly among certain groups.

HIV Incidence (new infections): The estimated incidence of HIV has remained stable overall in recent years, at about 50,000 new HIV infections per year[2]. Within the overall estimates, however, some groups are affected more than others. MSM continue to bear the greatest burden of HIV infection, and among races/ethnicities, African Americans continue to be disproportionately affected.

HIV Diagnoses (new diagnoses, regardless of when infection occurred or stage of disease at diagnosis): In 2012, an estimated 47,989 people were diagnosed with HIV infection in the United States. In that same year, an estimated 27,928 people were diagnosed with AIDS. Overall, an estimated 1,170,989 people in the United States have been diagnosed with AIDS[3].

Deaths: An estimated 13,834 people with an AIDS diagnosis died in 2011, and approximately 648,459 people in the United States with an AIDS diagnosis have overall[3]. The deaths of persons with an AIDS diagnosis can be due to any cause—that is, the death may or may not be related to AIDS.

In Utah, there were 2,872 HIV infected individuals assumed to be alive and residing in Utah by December 31, 2013. Of these individuals, 1,505 (52%) have progressed to HIV Infection Stage 3 (AIDS) at some point during their infection. Males, accounting for 85% of the infections, continue to be primarily affected by HIV in Utah. The majority (64%) of males with HIV are men who have sex with men (MSM) followed by MSM/IDU

(Injection Drug Use) at 16% and IDU at 8%. Females with HIV are primarily heterosexual (48%) followed IDU (24%). While the number of those living in Utah with HIV increases each year, the rate of newly diagnosed infections has decreased over the last decade from 5.4 infections per 100,000 in 2004 to 3.6 per 100,000 in 2013.

References

[1] CDC. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data—United States and 6 dependent areas—2012. *HIV Surveillance Supplemental Report* 2014;19(No.3). Published November 2014.

[2] CDC. Estimated HIV incidence in the United States, 2007–2010. *HIV Surveillance Supplemental Report* 2012;17(No. 4). Published December 2012.

[3] CDC. *HIV Surveillance Report*, 2012; vol. 24. Published November 2014.

✓PUBLIC HEALTH CONTROL MEASURES

Public health responsibility:

- Investigate all suspect cases of disease and fill out and submit appropriate disease investigation forms.
- Provide education to the general public, clinicians, and first responders regarding disease transmission and prevention.
- Identify clusters or outbreaks of this disease.
- Identify sources of exposure and stop further transmission.

Prevention:

HIV/AIDS prevention programs can be effective only with full community and political commitment to change and/or reduce high HIV-risk behaviors.

- Public and school health education must stress that having multiple and especially concurrent and/or overlapping sexual partners or sharing drug paraphernalia all increase the risk of HIV infection.
- The specific needs of minorities; persons with different primary languages and those with visual, hearing or other impairments must be addressed.
- Students must be taught to avoid or reduce risky behavior.
- Programs for school-age youth should address the needs and developmental levels of both students and those who do not attend school
- The only absolute way to avoid infection through sex is to abstain from sexual intercourse or to engage in mutually monogamous sexual intercourse only with someone known to be uninfected.
- Latex condoms must be used correctly every time a person has vaginal, anal, or oral sex. Only water-based lubricants should be used with male condoms.
- Expansion of facilities for treating drug users reduces HIV transmission. Programs that instruct needle users in decontamination methods and needle exchange have been shown to be effective.

- HIV testing and counseling is an important intervention raising awareness of HIV status, promoting behavioral change and diagnosing HIV infection.
- Pregnant women should be counseled about HIV early in pregnancy and where culturally and socially appropriate, encourage a HIV test as a routine part of standard antenatal care.
- Care must be taken in handling, using and disposing of needles or other sharp instruments.
- Health care workers should wear latex gloves, eye protection and other personal protective equipment in order to avoid contact with blood or other bodily fluids.
- The risk of transmission from a HIV infected pregnant woman to her baby is significantly reduced if the mother takes zidovudine, or other anti-retroviral agents during pregnancy, labor, and delivery, and if her baby is treated for the first six weeks of life.

Chemoprophylaxis:

All sexual partners and needle-sharing partners should be evaluated and tested for HIV/AIDS as well as infants born to mothers with HIV/AIDS.

Vaccine:

None.

Isolation and quarantine requirements:

Isolation: Avoid unprotected sexual contact
Hospital: Standard body substance precautions.
Quarantine: Not applicable

✓CASE INVESTIGATION

Reporting:

HIV infections (including AIDS) are required by Utah law to be reported to public health within three working days after identification. *R386-702-4 (b). Reporting.* Reporting of HIV-related test results and specific patient information are also required. *R386-702-9. Special Measures for the Control of HIV/AIDS.*

Rapid-Rapid HIV Testing Case Definition:

The following description and algorithm describes the test methods that the Communicable Disease Prevention Program (CDPP) of the Utah Department of Health recommends its grantees, local health departments and other agencies as a guide on how to report test results when using rapid HIV testing technology to assess individuals HIV status.

The CDPP recommends that Clearview COMPLETE HIV 1/2 be used as Test 1 and Oraquick ADVANCE Rapid HIV 1/2 for Test 2. Please refer to the Utah Department of Health, Communicable Disease Prevention Program Rapid HIV and HCV Testing

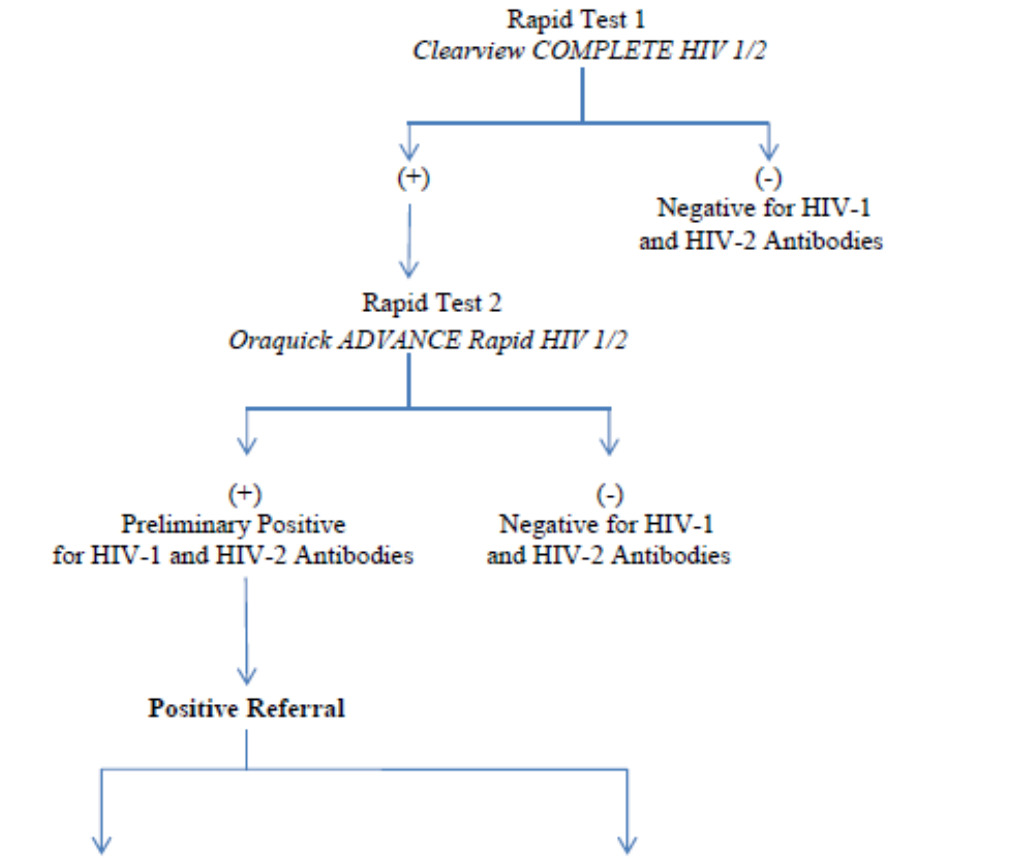
Guidance for specific information on the above tests and pertinent guidance on how to use rapid testing technology. A copy of this guidance could be access at: http://health.utah.gov/epi/testing/resources/Rapid_Testing_Guidance.pdf

HIV Rapid-Rapid Testing Description:

1) Test 1 - Clearview COMPLETE HIV 1/2
   a) If result is negative, then no further testing required; case is Negative
   b) If result is reactive/preliminary-positive, then perform Test 2; case is Suspect

2) Test 2 - Oraquick ADVANCE Rapid HIV 1/2
   a) If result is negative, then discordant or inconclusive results; case is Suspect and should be reported as positive. Repeat testing should occur in 30 days.
   b) If result is reactive/preliminary-positive, case is Probable and should be reported as positive.
      i) CBOs
         (1) Initiate Partner Identification – if possible,
            (a) Active referral to Local Health Department for Partner Services
         (2) Active referral to medical care
      ii) Local Health Departments
         (1) Initiate Partner Services
         (2) Active referral to medical care

Utah Rapid-Rapid HIV Testing Algorithm



(+) Indicates reactive test result
(-) Indicates non-reactive test result

Surveillance Case Definition:

Section 1: Criteria for a Confirmed Case

Criteria for a confirmed case can be met by either laboratory evidence or clinical evidence, as described below. Laboratory evidence is preferred over clinical evidence.

1.1: Persons Aged ≥18 Months and Children Aged <18 Months whose Mothers were Not Infected

1.1.1: Laboratory Evidence

Laboratory criteria require reporting of the date of the specimen collection for positive test results in multitest algorithms or stand-alone virologic tests and enough information about the tests to determine that they meet any of the following criteria:

- A multitest algorithm consisting of
    - A positive (reactive) result from an initial HIV antibody or combination antigen/antibody test, and
    - An accompanying or subsequent positive result from a supplemental HIV test different from the initial test (*8*).

The initial HIV antibody or antigen/antibody test and the supplemental HIV test that is used to verify the result from the initial test can be of any type used as an aid to diagnose HIV infection. For surveillance purposes, supplemental tests can include some not approved by the Food and Drug Administration (FDA) for diagnosis (e.g., HIV-1 viral load test, HIV-2 Western blot/immunoblot antibody test, and HIV-2 NAT). However, the initial and supplemental tests must be "orthogonal" (i.e., have different antigenic constituents or use different principles) to minimize the possibility of concurrent nonspecific reactivity. Because the antigenic constituents and test principles are proprietary information that might not be publicly available for some tests, tests will be assumed to be orthogonal if they are of different types. For example:

- One test is a combination antigen/antibody test and the other an antibody-only test.
- One test is an antibody test and the other a NAT.
- One test is a rapid immunoassay (a single-use analytical device that produces results in <30 minutes) and the other a conventional immunoassay.
- One test is able to differentiate between HIV-1 and HIV-2 antibodies and the other is not.

Tests also will be assumed to be orthogonal if they are of the same type (e.g., two conventional immunoassays) but made by different manufacturers. The type of HIV antibody test that verifies the initial test might be one formerly used only as an initial test (e.g., conventional or rapid immunoassay, HIV-1/2 type-differentiating

immunoassay), or it might be one traditionally used as a supplemental test for confirmation (e.g., Western blot, immunofluorescence assay).

- A positive result of a multitest HIV antibody algorithm from which only the final result was reported, including a single positive result on a test used only as a supplemental test (e.g., HIV Western blot, immunofluorescence assay) or on a test that might be used as either an initial test or a supplemental test (e.g., HIV-1/2 type-differentiating rapid antibody immunoassay) when it might reasonably be assumed to have been used as a supplemental test (e.g., because the algorithm customarily used by the reporting laboratory is known).

  A positive result or report of a detectable quantity (i.e., within the established limits of the laboratory test) from any of the following HIV virologic (i.e., nonantibody) tests:
  - Qualitative HIV NAT (DNA or RNA)
  - Quantitative HIV NAT (viral load assay)
  - HIV-1 p24 antigen test
  - HIV isolation (viral culture) or
  - HIV nucleotide sequence (genotype).

1.1.2: Clinical (Nonlaboratory) Evidence

Clinical criteria for a confirmed case (i.e., a "physician-documented" diagnosis for which the surveillance staff have not found sufficient laboratory evidence described above) are met by the combination of:

- A note in a medical record by a physician or other qualified medical-care provider that states that the patient has HIV infection, and one or both of the following:
  - The laboratory criteria for a case were met based on tests done after the physician's note was written (validating the note retrospectively).
  - Presumptive evidence of HIV infection (e.g., receipt of HIV antiretroviral therapy or prophylaxis for an opportunistic infection), an otherwise unexplained low CD4+ T-lymphocyte count, or an otherwise unexplained diagnosis of an opportunistic illness (Appendix).

1.2: Children Aged <18 Months Born to Mothers Who Have an Unknown Infection Status or Were Known to be Infected

1.2.1: Laboratory Evidence

A child aged <18 months is categorized for surveillance purposes as HIV infected if all of the following criteria are met:

- Positive results on at least one specimen (not including cord blood) from any of following HIV virologic tests: HIV-1 NAT (DNA or RNA)
- HIV-1 p24 antigen test, including neutralization assay for a child aged >1 month
- HIV isolation (viral culture) or
- HIV nucleotide sequence (genotype).

- The test date (at least the month and year) is known.
- One or both of the following:
  - Confirmation of the first positive result by another positive result on one of the above virologic tests from a specimen obtained on a different date or
  - No subsequent negative result on an HIV antibody test, and no subsequent negative result on an HIV NAT before age 18 months.

1.2.2: Clinical Evidence

The same criteria as in section 1.1.2 or
All three of the following alternative criteria:
Evidence of perinatal exposure to HIV infection before age 18 months
. A mother with documented HIV infection or
. A confirmed positive test for HIV antibody (e.g., a positive initial antibody test or antigen/antibody test, confirmed by a supplemental antibody test) and a mother whose infection status is unknown or undocumented.

Diagnosis of an opportunistic illness indicative of stage 3 (Appendix).
No subsequent negative result on an HIV antibody test.

1.3: Definition for Date of Diagnosis of a Confirmed Case for all Ages

1.3.1: Laboratory Criteria

If the diagnosis is based on laboratory evidence, the diagnosis date is defined as the earliest date on which the specimen was obtained for a positive HIV test result.

1.3.2: Clinical Criteria

If the diagnosis was based on clinical evidence ("physician-documented") rather than laboratory evidence, the diagnosis date is defined as the date (at least the year) of diagnosis reported in the content of the medical record. If the diagnosis date was not reported in the note, the date when the note was written can be used as a proxy.

Section 2: Criteria for Classifying the HIV Type as HIV-2

All HIV infections in the United States should be assumed to be type 1 (HIV-1) unless laboratory test results are sufficient to classify the infection as type 2 (HIV-2), dual HIV-1 and HIV-2 infections, or undifferentiated HIV infection, as described below. Clinical or epidemiologic evidence might lead to laboratory testing for HIV-2 but is insufficient for classifying the HIV type as HIV-2.

2.1: Persons Aged ≥18 Months and Children Aged <18 Months Not Perinatally Exposed

HIV-2 infection

For HIV-2 infection, one or more of the following laboratory criteria are necessary and sufficient:

- FDA-approved HIV1/2 type-differentiating antibody test result positive for HIV-2 and negative for HIV-1.
- Positive HIV-2 Western blot (WB) (or immunoblot or line assay) result and negative or indeterminate HIV-1 WB result.
- Positive qualitative HIV-2 NAT result.
- Detectable quantitative HIV-2 NAT (viral load).
- Laboratory results interpreted as consistent with HIV-2 infection by a laboratory expert experienced in differentiating HIV-2 from HIV-1 if laboratory evidence for HIV-2 is ambiguous.

Dual infection with HIV-1 and HIV-2

The HIV type is classified as "dual" infection (both HIV-1 and HIV-2) if both an HIV-1 NAT and an HIV-2 NAT are positive.

Undifferentiated HIV type

The HIV type is classified as "undifferentiated" if there is no positive or detectable result from an HIV-1 NAT and a laboratory expert cannot resolve ambiguous evidence for HIV-2, such as:

- HIV-2 WB is positive and HIV-1 WB is HIV positive or
- HIV-1/HIV-2 type-differentiating antibody test result interpretation is "undifferentiated" (positive for both HIV-1 and HIV-2).

2.2: Difficulty of Diagnosing HIV-2 Infection in Children Aged <18 Months Born to Mothers Known to be HIV-infected or whose HIV Infection Status is Unknown

In perinatally exposed children aged <18 months, antibody tests are not used to diagnose HIV infection because of the expectation that they might be false indicators of infection in the child due to passive transfer of maternal antibody. The HIV-1 NAT routinely used to diagnose HIV-1 infection in children of this age is likely to be negative in an HIV-2-infected child because it is insensitive to HIV-2. A positive HIV-2 NAT result would satisfy the criteria for a case. Otherwise, the diagnosis of HIV-2 infection in a child will need to wait until the child is aged 18 months, when it can be based on antibody test results.

Section 3: Criteria for Uninfected and Indeterminate HIV Infection Status of Perinatally Exposed Children Aged <18 Months

3.1: Uninfected

A child aged <18 months who was born to an HIV-infected mother or had a positive HIV antibody test result is classified for surveillance purposes as not infected with HIV if all three of the following criteria are met:

- Laboratory criteria for HIV infection are not met (see section 1.2.1)
- No diagnosis of a stage-3-defining opportunistic illness (Appendix) attributed to HIV infection and
- Either laboratory or clinical evidence of absence of HIV infection as described below.

3.1.1: Laboratory Evidence

Definitively Uninfected

- No positive HIV NAT (RNA or DNA) and
- At least one of the following criteria: At least two negative HIV NATs from specimens obtained on different dates, both of which were at age ≥1 month and one of which was at age ≥4 months.
- At least two negative HIV antibody tests from specimens obtained on different dates at age ≥6 months.

Presumptively Uninfected

- Criteria for definitively uninfected with HIV are not met
- At least one of the following four laboratory criteria are met: At least two negative NATs from specimens obtained on different dates, both of which were at age ≥2 weeks and one of which was at age ≥4 weeks.

- One negative NAT (RNA or DNA) from a specimen obtained at age ≥8 weeks.
- One negative HIV antibody test from a specimen obtained at age ≥6 months.
- If criteria for HIV infection had initially been met by one positive HIV NAT test then it must have been followed by at least two negative test results from specimens obtained on different dates, one of which is: A NAT test from a specimen obtained at age ≥8 weeks, or
- An HIV antibody test from a specimen obtained at age ≥6 months and
- No subsequent positive NAT.

3.1.2: Clinical Evidence

A note in a medical record by a physician or other qualified medical-care provider states that the patient is not infected with HIV.

3.2: Indeterminate HIV infection status

A child aged <18 months born to an HIV-infected mother is categorized as having perinatal exposure with an indeterminate HIV infection status if neither the criteria for being HIV-infected nor the criteria for being uninfected are met.

Section 4: Criteria for Classifying the Stage of HIV Infection

The stages of HIV infection defined in this document are for surveillance staging of disease and might not be appropriate for patient care, clinical research, or other purposes. A confirmed case that meets the criteria for diagnosis of HIV infection can be classified in one of five HIV infection stages (0, 1, 2, 3, or unknown). Stage 0 indicates early HIV infection, inferred from a negative or indeterminate HIV test result within 6 months of a confirmed positive result, and these criteria supersede and are independent of the criteria used for later stages. Stages 1, 2, and 3 are based on the CD4+ T-lymphocyte count. If the CD4+ count is missing or unknown, the CD4+ T-lymphocyte percentage of total lymphocytes can be used to assign the stage. Cases with no information on CD4+ T-lymphocyte count or percentage are classified as stage unknown. If a stage-3–defining opportunistic illness has been diagnosed, then the stage is 3 regardless of CD4 T-lymphocyte test results, unless the criteria described below for stage 0 are met. CD4+ T-lymphocyte counts or percentages at the time of diagnosis allow classification of cases by stage at diagnosis. Subsequent CD4+ T-lymphocyte counts or percentages help monitor disease progression and whether the person is receiving on-going care.

The stage characterizes the status of HIV disease at a particular point in time. Of primary interest to surveillance is the stage at initial diagnosis, but the stage can change in either direction after diagnosis and might be defined with reference to dates of interest such as the most advanced stage recorded through a particular date. The stages are defined as follows:

Stage 0

The criteria for stage 0 consist of a sequence of discordant test results indicative of early HIV infection in which a negative or indeterminate result was within 180 days of a positive result. The criteria for stage 0 supersede and are independent of the criteria used for other stages.

Stage 0 can be established either:

Based on testing history (previous negative/indeterminate test results): a negative or indeterminate HIV test (antibody, combination antigen/antibody, or nucleic acid test) result within 180 days before the first confirmed positive HIV test result of any type. The first positive test result could be any time before the positive supplemental test result that confirms it; or

Based on a testing algorithm: a sequence of tests performed as part of a laboratory testing algorithm that demonstrate the presence of HIV-specific viral markers such as p24 antigen or nucleic acid (RNA or DNA) 0–180 days before or after an antibody test that had a negative or indeterminate result. Examples of algorithms that would fulfill this requirement include: A positive initial HIV immunoassay result (e.g., antigen/antibody or

antibody only) followed by a negative or indeterminate supplemental antibody test result (e.g., HIV-1/HIV-2 antibody differentiation assay or Western blot) and a positive NAT result. All three tests are usually performed as part of the same testing algorithm but time might elapse between tests if additional specimens must be obtained for definitive supplemental testing.

A negative initial HIV immunoassay result followed by a positive NAT result that might have been done to evaluate the presence of acute HIV infection (*19,20*).

Exception

A confirmed case of HIV infection is not in stage 0 if the negative or indeterminate HIV test used as the criterion for it being a recent infection was preceded >60 days by evidence of HIV infection, such as a confirmed positive HIV test result, a clinical (physician-documented) diagnosis of HIV infection for which the surveillance staff have not found sufficient laboratory evidence, a CD4+ T-lymphocyte test result indicative of stage 3 (Table), or an opportunistic illness indicative of stage 3 (Appendix).

TABLE. HIV infection stage* based on age-specific CD4+ T-lymphocyte count or CD4+ T-lymphocyte percentage of total lymphocytes

	Age on date of CD4+ T-lymphocyte test					
	<1 yr		1–5 yrs		≥6 yrs	
Stage	Cells/μL	%	Cells/μL	%	Cells/μL	%
1	≥1,500	≥34	≥1,000	≥30	≥500	≥26
2	750–1,499	26–33	500–999	22–29	200–499	14–25
3	<750	<26	<500	<22	<200	<14

* The stage is based primarily on the CD4+ T-lymphocyte count; the CD4+ T-lymphocyte count takes precedence over the CD4 T-lymphocyte percentage, and the percentage is considered only if the count is missing. There are three situations in which the stage is not based on this table: 1) if the criteria for stage 0 are met, the stage is 0 regardless of criteria for other stages (CD4 T-lymphocyte test results and opportunistic illness diagnoses); 2) if the criteria for stage 0 are not met and a stage-3-defining opportunistic illness has been diagnosed (Appendix), then the stage is 3 regardless of CD4 T-lymphocyte test results; or 3) if the criteria for stage 0 are not met and information on the above criteria for other stages is missing, then the stage is classified as unknown.

Classifying a case as stage 0 depends on documenting negative HIV antibody test results in the specific situations described above. Negative test results from testing algorithms that have concluded that the person is not infected need not be reported to HIV surveillance programs.

Progression of Stage After Initial Diagnosis in Stage 0

Although the stage at diagnosis does not change, if >180 days have elapsed after the stage was 0 at diagnosis, the stage at the later date is classified as 1, 2, 3, or unknown, depending on CD4+ T-lymphocyte test results (Table) or whether an opportunistic illness had been diagnosed >180 days after HIV infection diagnosis.

Stages 1, 2, 3, and unknown

If the criteria for stage 0 are not met, the stage is classified as 1, 2, 3, or unknown, depending on CD4+ T-lymphocyte test results or whether an opportunistic illness was diagnosed (Table). Infection among children aged 6–12 years is staged with the same criteria as infection among adults and adolescents, including opportunistic illnesses indicative of stage 3 (Appendix) that formerly applied only to adults and adolescents (i.e., pulmonary tuberculosis, recurrent pneumonia, and cervical cancer). Multiple or recurrent bacterial infections (other than recurrent salmonella septicemia), which formerly applied only to children aged <13 years, now apply only to children aged <6 years. Lymphoid interstitial pneumonia is no longer classified as indicative of stage 3 in children because it is associated with moderate rather than severe immunodeficiency (*4*). The diagnosis of any of the opportunistic illnesses, irrespective of diagnostic method used, will meet the criteria for staging, thereby eliminating the requirement in the 2008 case definition for some of them to be "definitively" diagnosed.

Outbreaks:

A HIV/AIDS outbreak occurs when the observed rate of disease in a geographical area exceeds the 5-year average by two standard deviations.

Identification of case contacts:

The contact investigation is an integral part of finding contacts. Patients should be instructed to identify their sex partners and needle-sharing partners for testing.

Case contact management:

All contacts should be evaluated, and tested if they had sexual contact or shared a needle with the patient during the 12 months preceding the diagnosis of the patient, or six months from the patient's last negative test, or if married during the past 10 years. If sexual contact or needle sharing occurred during the preceding three months (window period), then these contacts need to be re-tested after three months of their last contact.

✓REFERENCES

American Academy of Pediatrics. [Human Immunodeficiency Virus Infection.] In: Pickering L.K., ed. *Red Book: 2003 Report of the Committee on Infectious Diseases, 26th Edition.* Elk Grove Village, IL, American Academy of Pediatrics; 2003: 360–382.

"Exploring. HIV Infection and AIDS: An Overview." National Institute of Allergy and Infectious Diseases. March 2005.
<www.niaid.nih.gov/factsheets/hivinf.htm>.

"Exploring. How HIV Causes AIDS." National Institute of Allergy and Infectious Diseases. November 2004.
<www.niaid.nih.gov/factsheets/howhiv.htm>.

"Fact Sheet. HIV and Its Transmission." Centers for Disease Control and Prevention, National Center for HIV, STD and TB Prevention, Division of HIV/AIDS Prevention. September 2003.
<www.cdc.gov/hiv/pubs/facts/transmission.htm>.

"Facts & Figures. HIV/AIDS Statistics." National Institute of Allergy and Infectious Diseases. October 2005.
<www.niaid.nih.gov/factsheets/aidsstat.htm>.

UDOH. Communicable Disease Rule R388-803: HIV Test Reporting. Authority for this rule is established in Title 26, Chapter 6, Sections 3 and 3.5 of the Communicable Disease Control Act.

Centers for Disease Control, Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR 46 (RR-10), 1997.l.

Control of Communicable Diseases Manual (18th Edition), Heymann, D.L., Ed; 2004.

Red Book: 2003 Report of the Committee on Infectious Diseases (26th Edition), Larry K. Pickering MD, Ed; 2003.

Principles and Practice of Infectious Disease (6th Edition), Gerald L. Mandell, John E. Bennett, and Raphael Dolin Eds; 2005.

Massachusetts Department of Public Health, Guide to Surveillance, Reporting and Control, 2006.

ARUP Labs; Physician's Guide to Laboratory Test Selection and Interpretation.

Sexually Transmitted Diseases (3rd Edition), King K. Holmes, P Frederick Sparling, Der-Anders Mardh, Stanley M. Lemon, Walter E. Stamm, Peter Piot, Judith N. Wasserheit, 1999.

CDC, Sexually Transmitted Diseases Treatment Guidelines, 2006.

Appendix: Stage-3-Defining Opportunistic Illnesses in HIV Infection

Bacterial infections, multiple or recurrent*
Candidiasis of bronchi, trachea, or lungs
Candidiasis of esophagus
Cervical cancer, invasive†
Coccidioidomycosis, disseminated or extrapulmonary
Cryptococcosis, extrapulmonary
Cryptosporidiosis, chronic intestinal (>1 month's duration)
Cytomegalovirus disease (other than liver, spleen, or nodes), onset at age >1 month
Cytomegalovirus retinitis (with loss of vision)
Encephalopathy attributed to HIV§
Herpes simplex: chronic ulcers (>1 month's duration) or bronchitis, pneumonitis, or esophagitis (onset at age >1 month)
Histoplasmosis, disseminated or extrapulmonary
Isosporiasis, chronic intestinal (>1 month's duration)
Kaposi sarcoma
Lymphoma, Burkitt (or equivalent term)
Lymphoma, immunoblastic (or equivalent term)
Lymphoma, primary, of brain
Mycobacterium avium complex or *Mycobacterium kansasii*, disseminated or extrapulmonary
Mycobacterium tuberculosis of any site, pulmonary†, disseminated, or extrapulmonary
Mycobacterium, other species or unidentified species, disseminated or extrapulmonary
Pneumocystis jirovecii (previously known as "*Pneumocystis carinii*") pneumonia
Pneumonia, recurrent†
Progressive multifocal leukoencephalopathy
Salmonella septicemia, recurrent
Toxoplasmosis of brain, onset at age >1 month
Wasting syndrome attributed to HIV§

* Only among children aged <6 years.
† Only among adults, adolescents, and children aged ≥6 years.
§ Suggested diagnostic criteria for these illnesses, which might be particularly important for HIV encephalopathy and HIV wasting syndrome, are described in the following references: CDC. 1994 Revised classification system for human immunodeficiency virus infection in children less than 13 years of age. MMWR 1994;43(No. RR-12). CDC. 1993 Revised classification system for HIV infection and expanded surveillance case definition for AIDS among adolescents and adults. MMWR 1992;41(No. RR-17).